CLAIMS

1. A holographic recording apparatus for recording data on a holographic recording medium in the form of a flat plate which includes a recording layer comprising a photosensitive material and for which recording is achieved by an interference pattern of a coherent light beam, the apparatus comprising:

a pickup including an objective lens which focuses the coherent light beam, for moving the objective lens along a recording track of the holographic recording medium and detecting reflected light from the recording track to perform focus- and tracking-servo control;

a relative velocity determination unit for determining a relative velocity of a converging position of the objective lens with respect to the holographic recording medium;

a driving unit for changing a relative position of the objective lens with respect to an optical path of the coherent light beam in such a manner that the relative velocity falls within a predetermined range at least during a predetermined period; and

a control unit for performing recording for the recording layer during the predetermined period.

2. The holographic recording apparatus according to claim 1, wherein the relative velocity determination unit determines the relative velocity based on address information

obtained from the holographic recording medium.

3. The holographic recording apparatus according to claim 2, wherein the address information is pre-pit information.

4. The holographic recording apparatus according to claim 1, wherein the relative velocity determination unit determines the relative velocity based on a detection signal of markers arranged at predetermined intervals in the holographic recording medium.

5. The holographic recording apparatus according to claim 1, wherein the driving unit drives the objective lens so that the relative velocity falls within a predetermined range at least during a predetermined period.

6. The holographic recording apparatus according to claim 5, wherein the driving unit drives the objective lens to bring the coherent light beam into focus on the marker.

7. The holographic recording apparatus according to claim 5, wherein the driving unit drives the objective lens in such a manner that a relative velocity of the converging position of the objective lens with respect to the maker falls within a predetermined range at least during a predetermined period while the converging position of the objective lens is shifted from the marker by a predetermined distance.

8. The holographic recording apparatus according to claim 1, wherein the driving unit moves an incident optical path of the coherent light beam to the objective lens to make the relative velocity fall within a predetermined range at least during a predetermined period.

9. The holographic recording apparatus according to claim 8, wherein the driving unit rotates a mirror arranged in an optical path of the coherent light beam to move the incident optical path of the coherent light beam to the objective lens.

10. The holographic recording apparatus according to claim 8, wherein the driving unit rotates a polygon mirror arranged in an optical path of the coherent light beam to move the incident optical path of the coherent light beam to the objective lens.

11. A holographic reproducing apparatus for reproducing data recorded on a holographic recording medium in the form of a flat plate which includes a recording layer comprising a photosensitive material and for which recording is achieved by an interference pattern of a coherent light pattern, the apparatus comprising:

a pickup including an objective lens focuses the coherent light beam, for moving the objective lens along a recording track of the holographic recording medium and detecting reflected light from the recording track so as to perform focus- and tracking-servo control;

a relative velocity determination unit for determining a relative velocity of a converging position of the objective lens with respect to the holographic recording medium;

a driving unit for changing a relative position of the objective lens with respect to an optical path of the coherent light beam in such a manner that the relative

velocity falls within a predetermined range at least during a predetermined period; and

a control unit for performing reproduction from the recording layer during the predetermined period.

12. The holographic reproducing apparatus according to claim 11, wherein the relative velocity determination unit determines the relative velocity based on address information obtained from the holographic recording medium.

13. The holographic reproducing apparatus according to claim 12, wherein the address information is pre-pit information.

14. The holographic reproducing apparatus according to claim 11, wherein the relative velocity determination unit determines the relative velocity based on a detection signal of markers arranged at predetermined intervals in the holographic recording medium.

15. The holographic reproducing apparatus according to claim 11, wherein the driving unit drives the objective lens so that the relative velocity falls within a predetermined range at least during a predetermined period.

16. The holographic reproducing apparatus according to claim 15, wherein the driving unit drives the objective lens to bring the coherent light beam into focus on the marker.

17. The holographic reproducing apparatus according to claim 15, wherein the driving unit drives the objective lens in such a manner that a relative velocity of the converging position of the objective lens with respect to the maker

falls within a predetermined range at least during a predetermined period while the converging position of the objective lens is shifted from the marker by a predetermined distance.

18. The holographic reproducing apparatus according to claim 11, wherein the driving unit moves an incident optical path of the coherent light beam to the objective lens to make the relative velocity fall within a predetermined range at least during a predetermined period.

19. The holographic reproducing apparatus according to claim 18, wherein the driving unit rotates a mirror arranged in an optical path of the coherent light beam to move the incident optical path of the coherent light beam to the objective lens.

20. The holographic reproducing apparatus according to claim 18, wherein the driving unit rotates a polygon mirror arranged in an optical path of the coherent light beam to move the incident optical path of the coherent light beam to the objective lens.

21. A holographic recording method for recording data on a holographic recording medium in the form of a flat plate which includes a recording layer comprising a photosensitive material and for which recording is achieved by an interference pattern of a coherent light beam, the method comprising:

a step of focusing the coherent light beam by an objective lens;

a step of moving the objective lens along a recording track of the holographic recording medium and detecting reflected light from the recording track to perform focus- and tracking-servo control;

a relative velocity determination step of determining a relative velocity of a converging position of the objective lens with respect to the holographic recording medium;

a driving step of changing a relative position of the objective lens with respect to an optical path of the coherent light beam in such a manner that the relative velocity falls within a predetermined range at least during a predetermined period; and

a step of performing recording for the recording layer during the predetermined period.

22. The holographic recording method according to claim 21, wherein the relative velocity determination step determines the relative velocity based on address information obtained from the holographic recording medium.

23. The holographic recording method according to claim 22, wherein the address information is pre-pit information.

24. The holographic recording method according to claim 21, wherein the relative velocity determination step determines the relative velocity based on a detection signal of markers arranged at predetermined intervals in the holographic recording medium.

25. The holographic recording method according to claim 21, wherein the driving step drives the objective lens so that

the relative velocity falls within a predetermined range at least during a predetermined period.

26. The holographic recording method according to claim 25, wherein the driving step drives the objective lens to bring the coherent light beam into focus on the marker.

27. The holographic recording method according to claim 25, wherein the driving step drives the objective lens in such a manner that a relative velocity of the converging position of the objective lens with respect to the maker falls within a predetermined range at least during a predetermined period while the converging position of the objective lens is shifted from the marker by a predetermined distance.

28. The holographic recording method according to claim 21, wherein the driving step moves an incident optical path of the coherent light beam to the objective lens to make the relative velocity fall within a predetermined range at least during a predetermined period.

29. The holographic recording method according to claim 28, wherein the driving step rotates a mirror arranged in an optical path of the coherent light beam to move the incident optical path of the coherent light beam to the objective lens.

30. The holographic recording method according to claim 28, wherein the driving step rotates a polygon mirror arranged in an optical path of the coherent light beam to move the incident optical path of the coherent light beam to the objective lens.

31. A holographic reproducing method for reproducing data recorded on a holographic recording medium in the form of a flat plate which includes a recording layer comprising a photosensitive material and for which recording is achieved by an interference pattern of a coherent light pattern, the method comprising:

a step of focusing the coherent light beam by an objective lens;

a step of moving the objective lens along a recording track of the holographic recording medium and detecting reflected light from the recording track so as to perform focus- and tracking-servo control;

a relative velocity determination step of determining a relative velocity of a converging position of the objective lens with respect to the holographic recording medium;

a driving step of changing a relative position of the objective lens with respect to an optical path of the coherent light beam in such a manner that the relative velocity falls within a predetermined range at least during a predetermined period; and

a step of performing reproduction from the recording layer during the predetermined period.

32. The holographic reproducing method according to claim 31, wherein the relative velocity determination step determines the relative velocity based on address information obtained from the holographic recording medium.

33. The holographic reproducing method according to claim

32, wherein the address information is pre-pit information.

34. The holographic reproducing method according to claim 31, wherein the relative velocity determination step determines the relative velocity based on a detection signal of markers arranged at predetermined intervals in the holographic recording medium.

35. The holographic reproducing method according to claim 31, wherein the driving step drives the objective lens so that the relative velocity falls within a predetermined range at least during a predetermined period.

36. The holographic reproducing method according to claim 35, wherein the driving step drives the objective lens to bring the coherent light beam into focus on the marker.

37. The holographic reproducing method according to claim 35, wherein the driving step drives the objective lens in such a manner that a relative velocity of the converging position of the objective lens with respect to the maker falls within a predetermined range at least during a predetermined period while the converging position of the objective lens is shifted from the marker by a predetermined distance.

38. The holographic reproducing method according to claim 31, wherein the driving step moves an incident optical path of the coherent light beam to the objective lens to make the relative velocity fall within a predetermined range at least during a predetermined period.

39. The holographic reproducing method according to claim

38, wherein the driving step rotates a mirror arranged in an optical path of the coherent light beam to move the incident optical path of the coherent light beam to the objective lens.

40. The holographic reproducing method according to claim 38, wherein the driving step rotates a polygon mirror arranged in an optical path of the coherent light beam to move the incident optical path of the coherent light beam to the objective lens.

41. A holographic recording medium on which an optical interference pattern of a coherent light beam is recorded as a spatial change of a refractive index, comprising a plurality of markers for positioning the optical interference pattern.

42. The holographic recording medium according to claim 41, comprising a substrate and a recording layer comprising a photosensitive material formed to be adjacent to the substrate, wherein the markers are formed in the substrate.

43. The holographic recording medium according to claim 41, comprising: a substrate; a burying layer for burying said substrate to flatten the substrate, the burying layer being adjacent to the substrate and having a different refractive index from the substrate; and a recording layer comprising a photosensitive material to be adjacent to the burying layer, wherein the markers are formed in the burying layer.

44. The holographic recording medium according to claim 41, comprising a recording layer including a photosensitive

material, wherein the markers are formed in the recording layer.

45. The holographic recording medium according to any one of claims 42 to 44, wherein the markers are arranged at predetermined intervals to form a recording track on a plane of the recording medium.

46. The holographic recording medium according to claim 45, wherein the markers are arranged concentrically on the plane of the recording medium.

47. The holographic recording medium according to claim 45, wherein the markers are arranged spirally on the plane of the recording medium.

48. The holographic recording medium according to claim 41, comprising a substrate having a groove for indicating a recording track formed thereon, and a recording layer comprising a photosensitive material to be adjacent to the substrate, wherein the markers are formed in the substrate along the groove.

49. The holographic recording medium according to claim 41, comprising: a substrate having a groove for indicating a recording track formed thereon; a burying layer for burying the substrate to flatten the substrate, the burying layer being adjacent to the substrate and having a different refractive index from the substrate; and a recording layer comprising a photosensitive material to be adjacent to the burying layer, wherein the markers are formed in the substrate along the groove.

50. The holographic recording medium according to claim 48 or 49, wherein the groove is wobbled and the markers are formed at predetermined positions in wobbling of the groove.

51. The holographic recording medium according to claim 41, wherein the markers have a transmittance of a predetermined value or more with respect to a wavelength of the coherent light beam that has generated the optical interference pattern.

52. The holographic recording medium according to claim 51, wherein the markers have a thickness so as to provide the markers with a transmittance of a predetermined value or more with respect to a wavelength of the coherent light beam that has generated the optical interference pattern.

53. The holographic recording medium according to any one of claims 48 to 50, wherein the groove has such a phase depth that the groove has no effect on transmitted and reflected light at a wavelength of the coherent light beam that has generated the optical interference pattern.